REMARKS/ARGUMENTS

Claims 1 and 2 are rejected under 35 USC 103 as being unpatentable over Tanabe in view of Owatari. Tanabe is cited as teaching the invention except for the oxygen content for which Owatari is relied upon. The Examiner considers the specific requirement of 0.1 to 2 ppm to be a design expedient which can be met by optimizing the general teaching in the art. Applicant respectfully submits that the Examiner's position is out of context of the art and of the present disclosure evidence.

As recited in claim 1, in the present invention, a UV-setting Ink-jet ink comprises color materials, UV-polymeric compound, and photo-induced polymerization initiator in a water-based medium, wherein a concentration of oxygen dissolved in the ink is 0.1 to 2 ppm at 25°C.

Conventionally, for a water-based ink, in order to avoid cavitations caused in an ink jet nozzle, air is removed from the ink so as to make the content of air in the ink almost "zero". The object of Owatari is to provide a device to remove oxygen from the ink.

However, the present inventor found that polymerization of UV-polymeric compound occurs in an ink left on a nozzle surface by a UV light leaking from the UV light source used to set the ink. As a result, after a long-term recording and exposure to the UV light, ink jetting from a nozzle may becomes unstable, see page 5 lines 11-14.

Then, the present inventor learned that by making a concentration of oxygen dissolved in the ink within 0.1 to 2 ppm at 25°C, such unnecessary polymerization of UV-polymeric compound can be avoided, page 7 lines 1-7.

As described in pages 15-16, comparative tests were conducted for 3 inks having concentrations of oxygen dissolved in ink of 0.6 ppm, 0.08ppm and 8.5 ppm respectively.

In the ink having concentrations of oxygen dissolved in ink of 0.08 ppm, after a 2-hour continuous recording, some of ink-jet nozzles were bent and blocked. Solid or gummy inks were found on the ink jet nozzle plate.

In the ink having concentrations of oxygen dissolved in ink of 8.5 ppm, after a 2-hour continuous recording, ink jet were not conducted properly due to cavitations.

In contrast, in the ink having concentrations of oxygen dissolved in ink of 0.6 ppm, after a 2-hour continuous recording, inks were jetted out successfully even after such a long continuous recording.

As the Examiner admits, Tanabe et al differs from the present invention that a concentration of oxygen dissolved in the ink is 0.1 to 2 ppm at 25°C.

Also, as the Examiner admits, Owatari teaches that after placing the oxygen absorbing capsule into the ink, the concentration of oxygen dissolved in the ink is substantially 0 (almost 0). Based on the discussion of Owatari (e.g. col. 1, lines 21-48; col. 2, lines 48-61 and col. 4, lines 7-10). The problem recognized is the presence of oxygen, and the solution is to remove it. Optimization of the Owatari teaching leads to the zero presence of oxygen. Owatari is not a teaching of the general conditions required by the present invention, but a teaching of the advantage of reducing the oxygen concentration to zero.

Accordingly, even if taking Tanabe et al and Owatari together, the present invention would not have been obtained by optimization.

Further, according to the result of the above comparative tests described in the present specification, the effect of the present invention to conduct ink jetting successfully even after such a long continuous recording would not have been obvious over Tanabe et al and Owatari.

Withdrawal of the rejections are therefore respectfully requested.

Respectfully submitted,

Frishauf, Holtz, Goodman
& Chick, P.C.
220 Fifth Ave., 16th Floor
New York, NY 10001-7708
Tel. No. (212) 319-4900
Fax No.: (212) 319-5101
MJC/ld

MARSHALL J. CHICK
Reg. No. 26,853